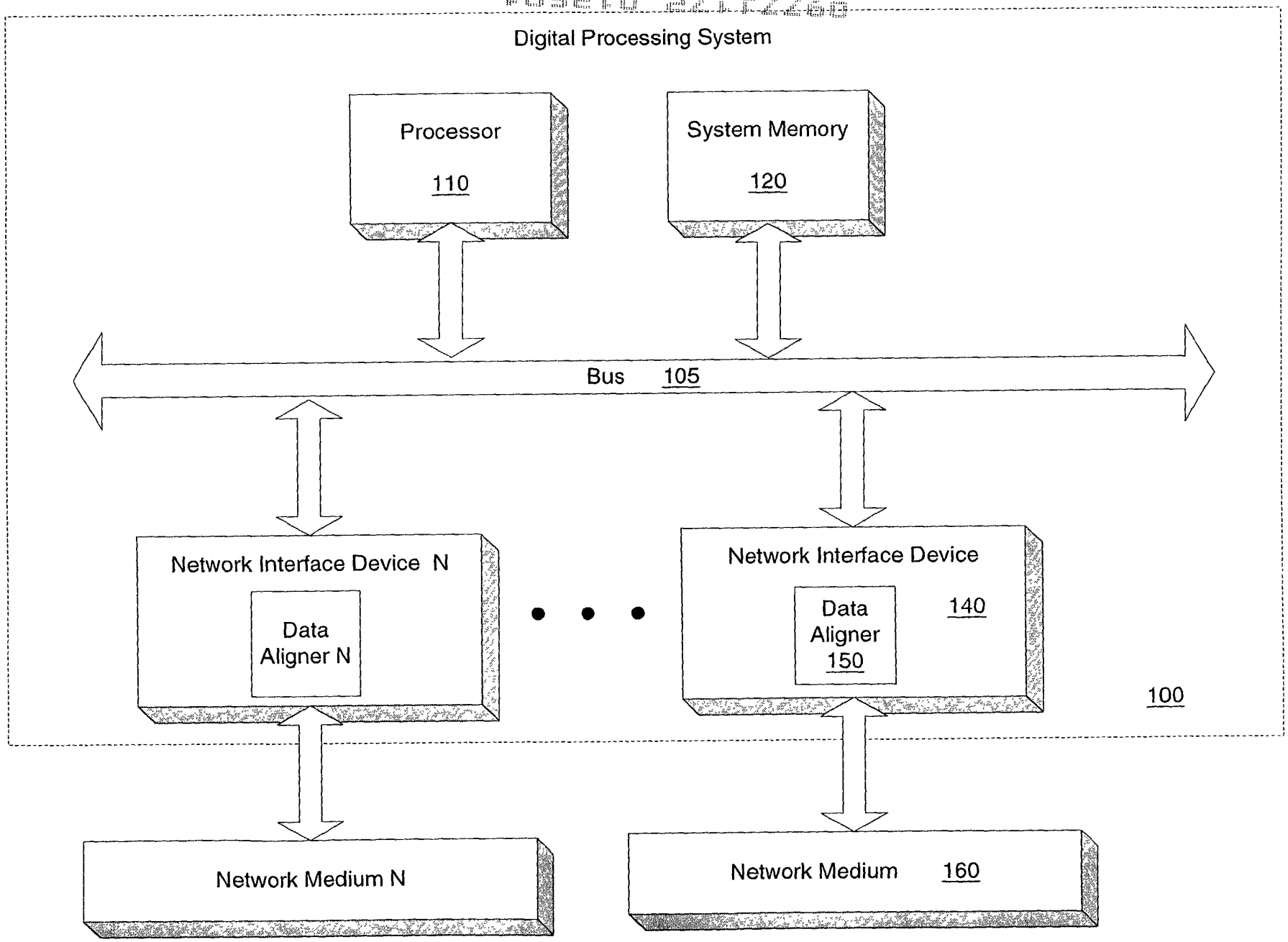
Digital Processing System
Processor
110
System Memory
120
Bus 105
Network Interface Device N
Data
Aligner N
Network Interface Device
Data
Aligner
150
140
100
Network Medium N
Network Medium 160

Figure 1

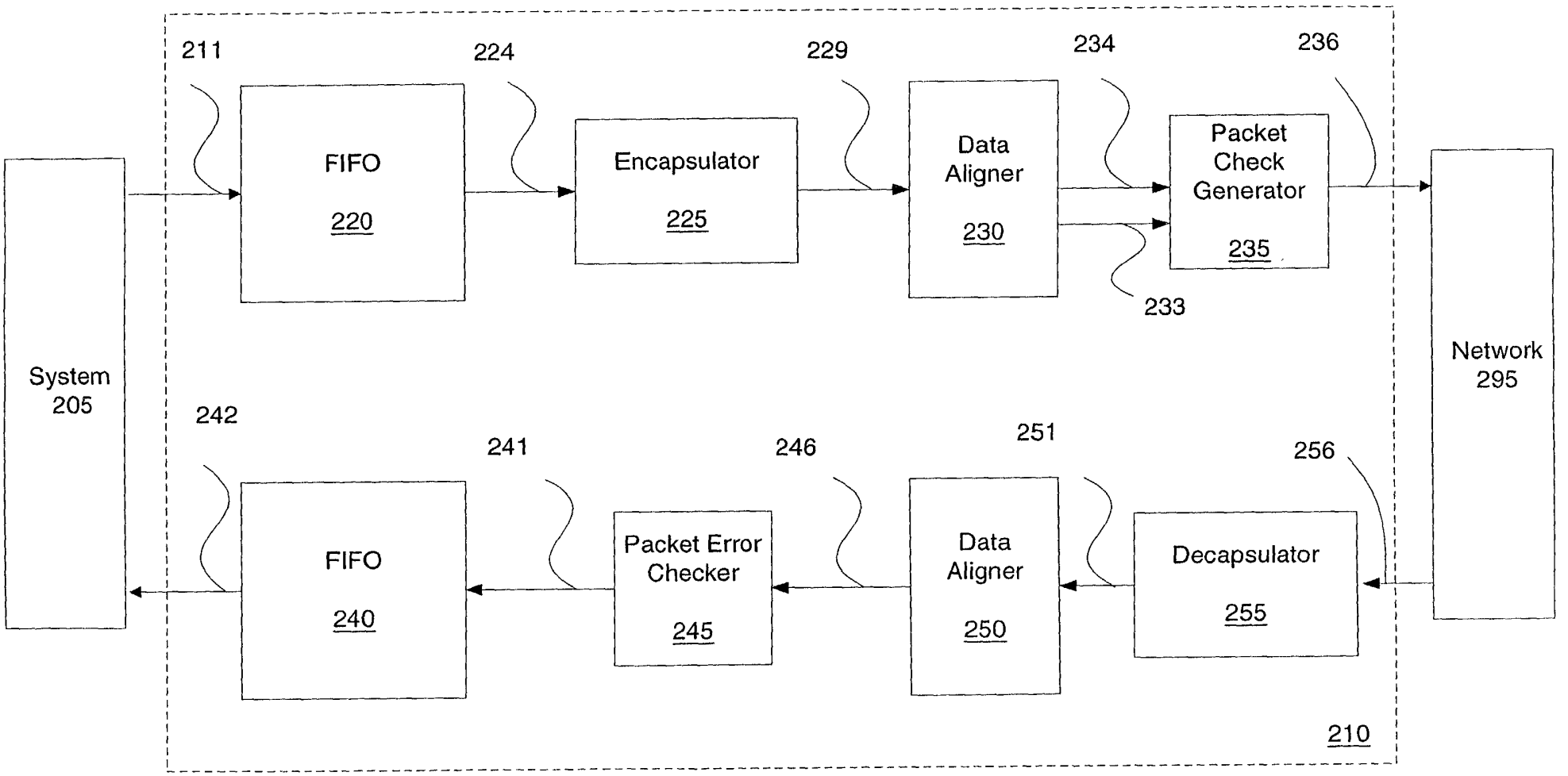
211
224
229
234
236
FIFO
220
Encapsulator
225
Data
Aligner
230
Packet
Check
Generator
235
233
System
205
Network
295
242
241
246
251
256
FIFO
240
Packet Error
Checker
245
Data
Aligner
250
Decapsulator
255
210

Figure 2

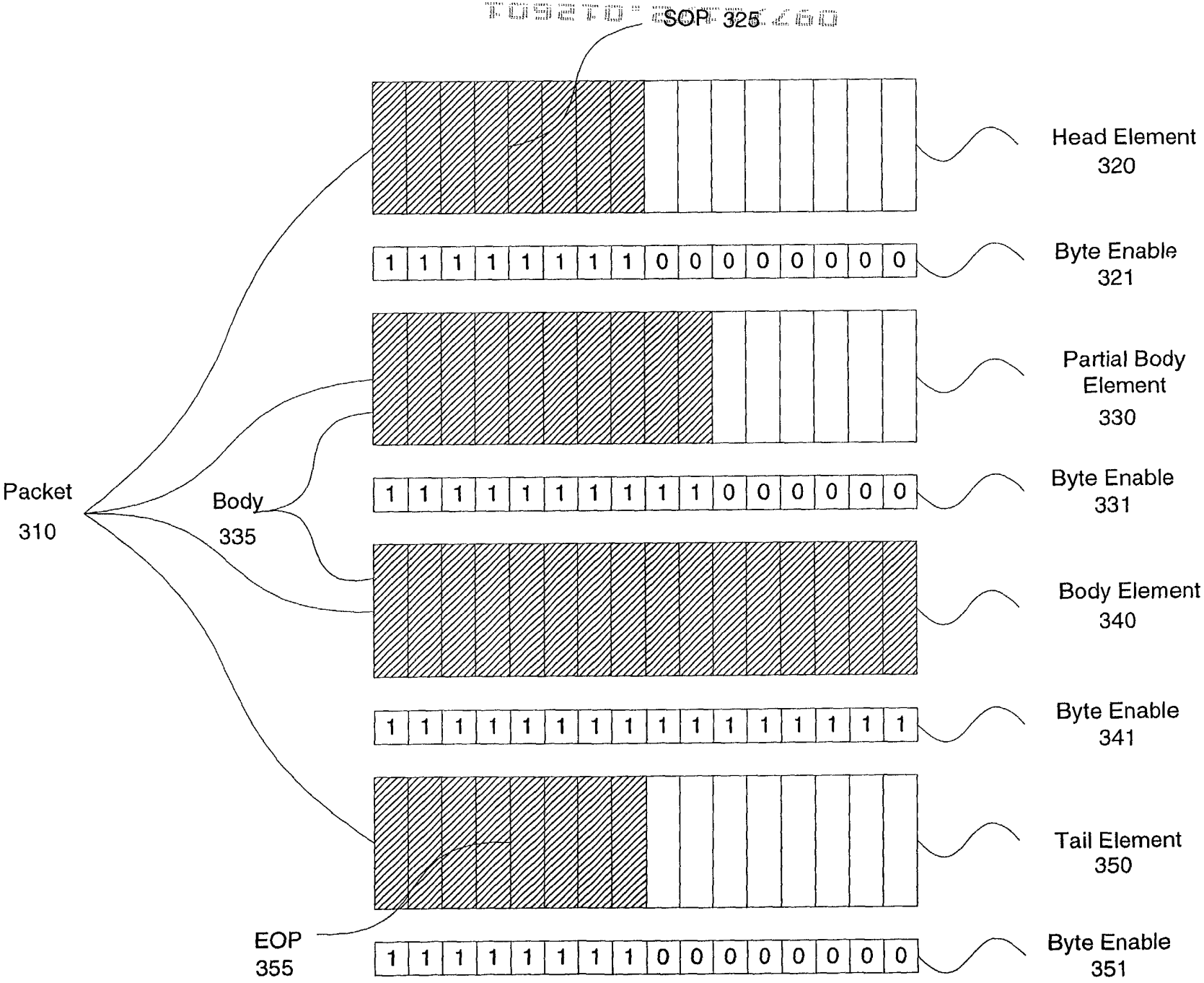
SOP 325
Head Element
320
1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0
Byte Enable
321
Partial Body
Element
330
1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0
Byte Enable
331
Body Element
340
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Byte Enable
341
Tail Element
350
1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0
Byte Enable
351
Packet
310
Body
335
EOP
355

Figure 3

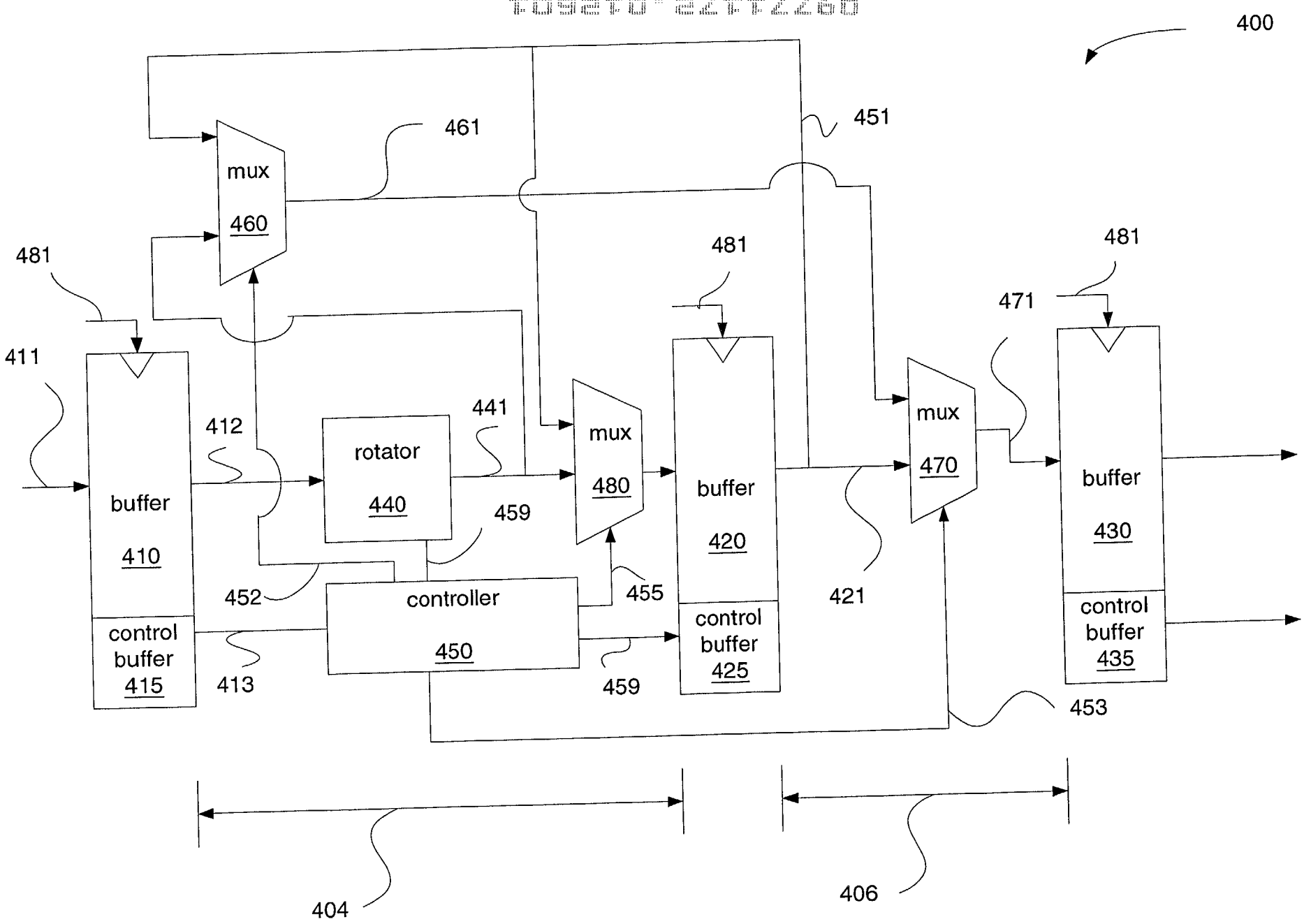
400
451
461
mux
460
481
481
481
471
411
buffer
410
412
rotator
440
441
mux
480
buffer
420
mux
470
buffer
430
459
452
controller
450
455
421
control
buffer
415
413
control
buffer
425
459
control
buffer
435
453
404
406

Figure 4

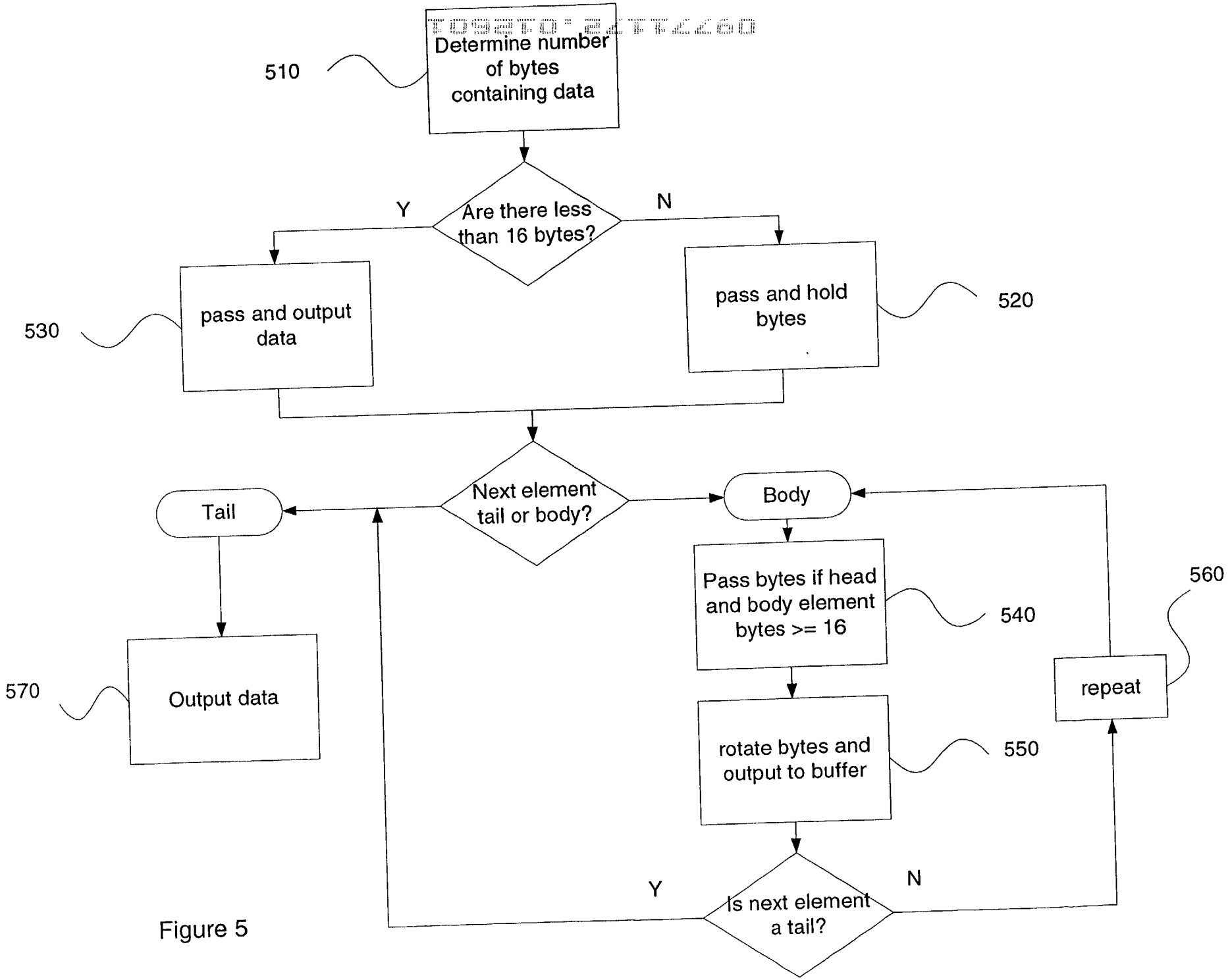
Determine number of bytes containing data
510
Are there less than 16 bytes?
Y
N
pass and output data
530
pass and hold bytes
520
Next element tail or body?
Tail
Body
Pass bytes if head and body element bytes >= 16
540
560
repeat
Output data
570
rotate bytes and output to buffer
550
Is next element a tail?
Y
N

Figure 5

	Complex Data stream Element	Mapped Data stream Element	Qualifier	Mapping Flow
610	Head	Head		Same sequence as in simple data stream
620	Body	Body		Same sequence as in simple data stream
630	Tail	Tail		Same sequence as in simple data stream
640	Hole	Hold		Hold state
650	Partial Body (Tail A)	Tail	Net Count <16	Follow tail sequence but: Suppress data aligner control output. Bypass intermediate buffer. Perform calculation using unpassed result.
660	Partial Body (Tail B)	Tail	Net Count >=16	Follow tail sequence but: Do not suppress byte enables, SOP. Suppress generation of EOP control signal. No bypass for computation.

Figure 6

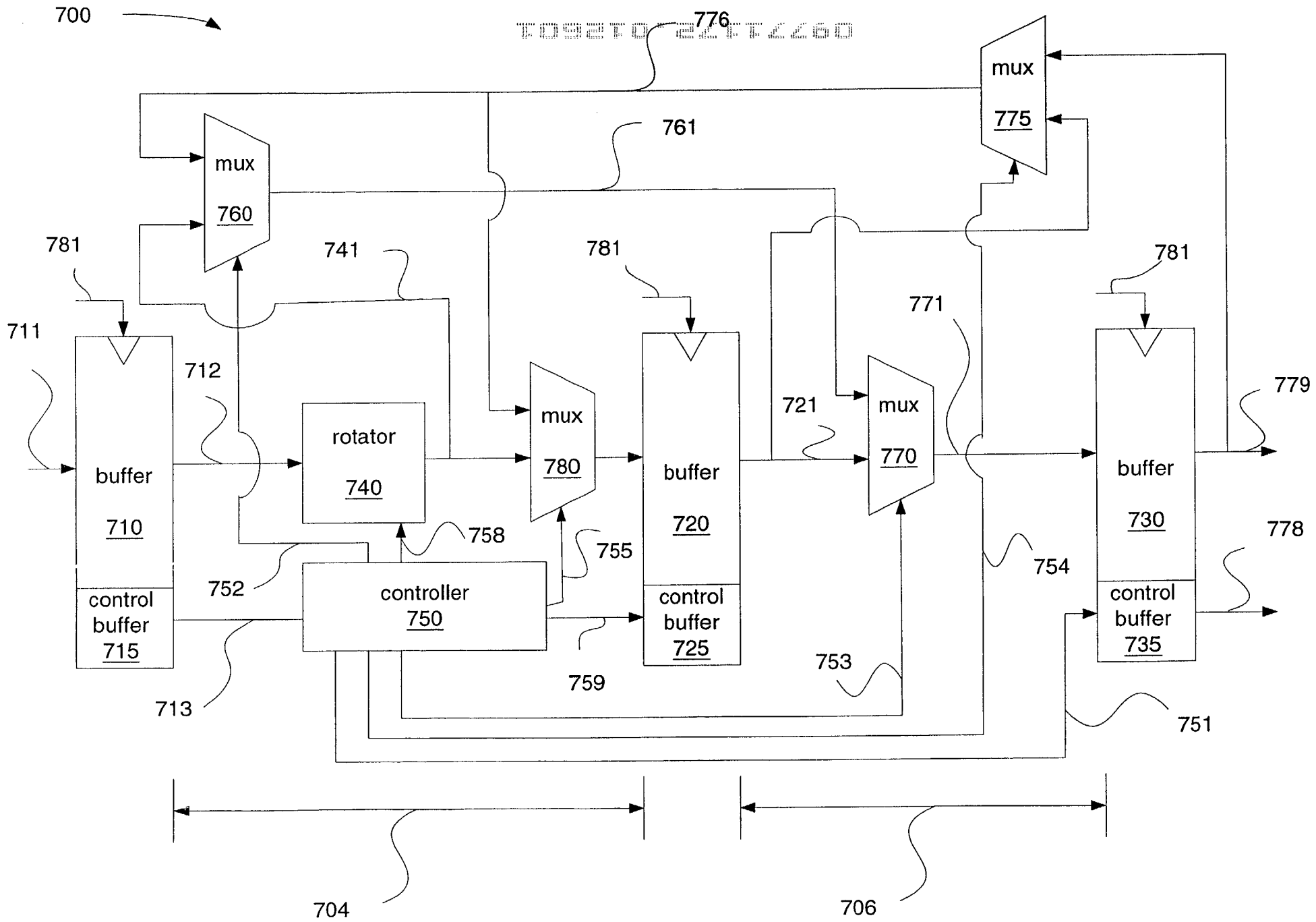
700
776
mux
775
761
mux
760
781
741
781
781
771
711
712
buffer
710
rotator
740
mux
780
buffer
720
721
mux
770
buffer
730
779
758
755
778
752
754
control
buffer
715
controller
750
control
buffer
725
control
buffer
735
753
759
751
713
704
706

Figure 7

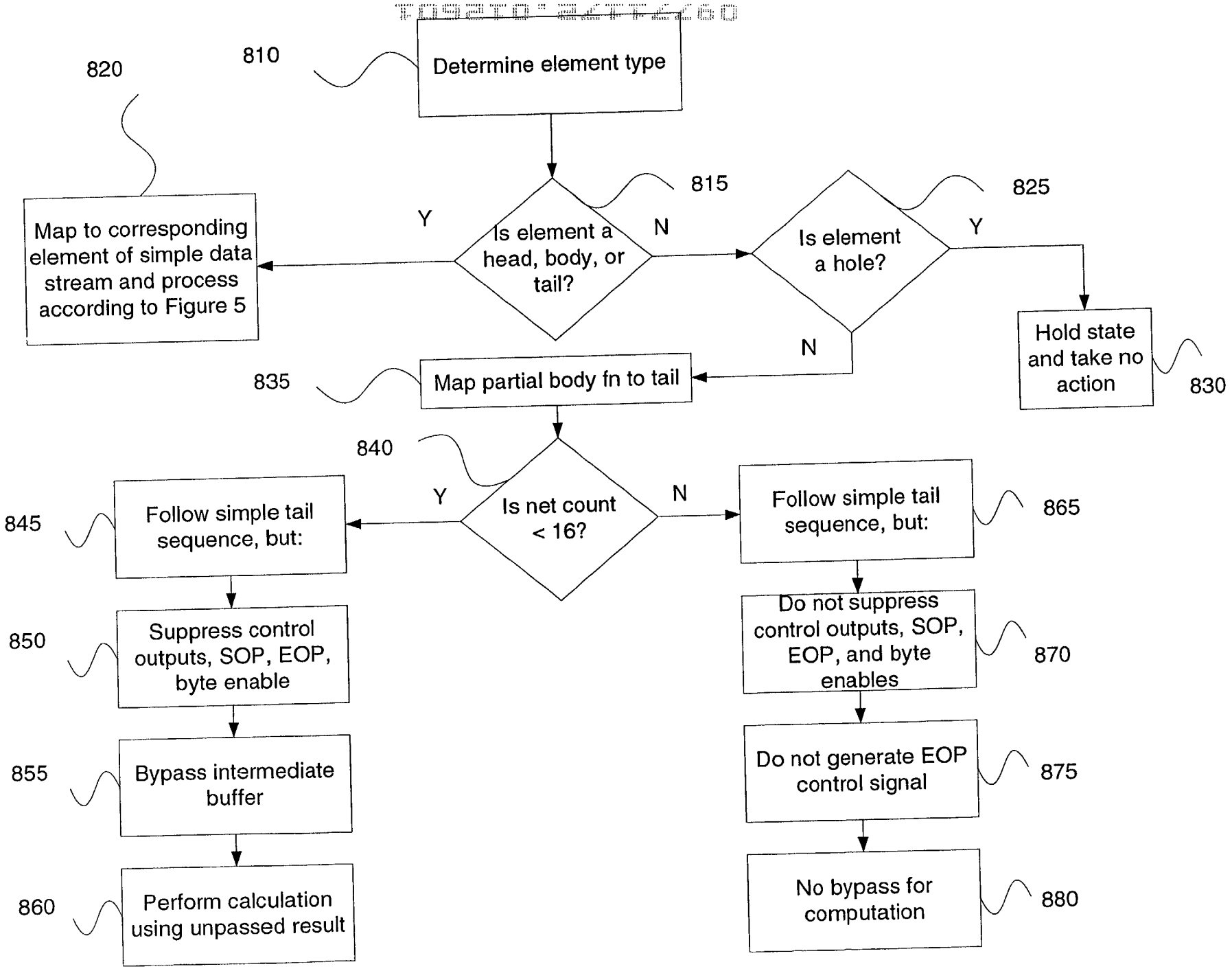
Determine element type
810
820
Map to corresponding element of simple data stream and process according to Figure 5
Is element a head, body, or tail?
815
Y
N
Is element a hole?
825
Y
Hold state and take no action
830
N
Map partial body fn to tail
835
Is net count < 16?
840
Y
N
Follow simple tail sequence, but:
845
Suppress control outputs, SOP, EOP, byte enable
850
Bypass intermediate buffer
855
Perform calculation using unpassed result
860
Follow simple tail sequence, but:
865
Do not suppress control outputs, SOP, EOP, and byte enables
870
Do not generate EOP control signal
875
No bypass for computation
880

Figure 8

TO92TO" 82TT42GO

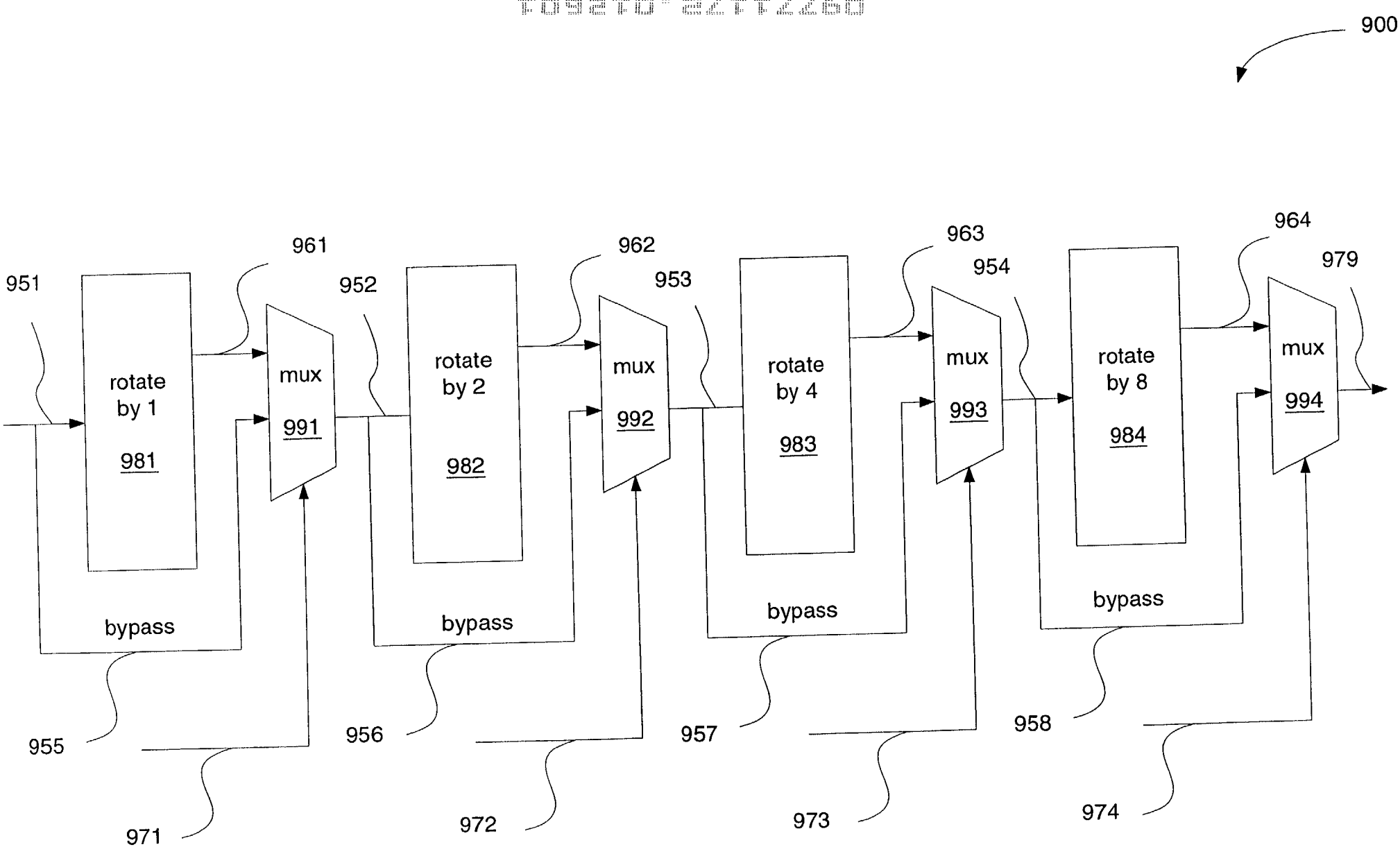

Figure 9

Serial Number	Shift Amount Value	Value of the Mux Control signal mxcntl[15:0]
1	4'b0000	16'b0000000000000000
2	4'b0001	16'b1000000000000000
3	4'b0010	16'b1100000000000000
4	4'b0011	16'b1110000000000000
5	4'b0100	16'b1111000000000000
6	4'b0101	16'b1111100000000000
7	4'b0110	16'b1111110000000000
8	4'b0111	16'b1111111000000000
9	4'b1000	16'b1111111100000000
10	4'b1001	16'b1111111110000000
11	4'b1010	16'b1111111111000000
12	4'b1011	16'b1111111111100000
13	4'b1100	16'b1111111111110000
14	4'b1101	16'b1111111111111000
15	4'b1110	16'b1111111111111100
16	4'b1111	16'b1111111111111110

FIGURE 10

Rotate_Amount	Input	Output
0	{ABCDEFGHIJKLMNOP}	{ABCDEFGHIJKLMNOP}
1	{ABCDEFGHIJKLMNOP}	{PABCDEFGHIJKLMNO}
2	{ABCDEFGHIJKLMNOP}	{OPABCDEFGHIJKLMN}
3	{ABCDEFGHIJKLMNOP}	{NOPABCDEFGHIJKLM}
4	{ABCDEFGHIJKLMNOP}	{MNOPABCDEFGHIJKL}
5	{ABCDEFGHIJKLMNOP}	{LMNOPABCDEFGHIJK}
6	{ABCDEFGHIJKLMNOP}	{KLMNOPABCDEFGHIJ}
7	{ABCDEFGHIJKLMNOP}	{JKLMNOPABCDEFGHI}
8	{ABCDEFGHIJKLMNOP}	{IJKLMNOPABCDEFGH}
9	{ABCDEFGHIJKLMNOP}	{HIJKLMNOPABCDEFG}
10	{ABCDEFGHIJKLMNOP}	{GHIJKLMNOPABCDEF}
11	{ABCDEFGHIJKLMNOP}	{FGHIJKLMNOPABCDE}
12	{ABCDEFGHIJKLMNOP}	{EFGHIJKLMNOPABCD }
13	{ABCDEFGHIJKLMNOP}	{DEFGHIJKLMNOPABC}
14	{ABCDEFGHIJKLMNOP}	{CDEFGHIJKLMNOPAB}
15	{ABCDEFGHIJKLMNOP}	{BCDEFGHIJKLMNOPA}

FIGURE 11